AN ANALYSIS OF THE LARGE STONE IMPLEMENTS FROM FIVE WORKSHOPS ON THE NORTH COAST OF NEW SOUTH WALES.

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(Figures 1-22, Plates xxxvi-xxxix.)

The 445 implements dealt with in this study are from aboriginal workshops at Point Plomer, Tacking Point beach, Dark Point, Anna Bay and Morna Point, on the lower north coast of New South Wales. Some of the specimens from Dark Point, Anna Bay and Morna Point were collected by the late W. W. Thorpe, and the others by the Rev. A. J. Barrett, Miss Lesley Hall and the author, while those from Point Plomer were collected during a week that I spent in the district in April, 1945. In addition, Mr. H. J. Wright, of Sydney, has kindly made available a considerable number of specimens in his collection from the three first-mentioned localities. The implements analysed comprise trimmed coroids, nuclei, blocks, worimi and karta slices, uniface pebbles, edge-ground axes, and a few normal flake and blade implements, including elouera and bondi points. This is the fifth paper of a series of analyses of sites in New South Wales from which reasonably complete collections are available.

All of the above workshops occur on the recent coastal sand-dunes, and they were apparently in use by the aborigines right up to the time of white occupation, when steel and iron replaced the stone and bone implements. This conclusion is indicated by the physiographic changes that have taken place in the area, as revealed by Dr. A. Voisey (1934, p. 342, fig. 1; 1935, pp. 88-103, fig. 1; 1939, map 1); he has shown that an

Fig. 1.—Map showing the location of the workshops herein described, and the tribes, of the lower north coast of New South Wales.
ancient shore-line existed along this coast from Tacking Point to Trial Bay and that the area, up to thirteen miles wide, between the old and new shore-lines was filled by deposition. The old middens and feeding grounds were then abandoned and the later ones, including those described in this paper, built up along the new coast-line. A description has already been given of a small number of implements (McCarthy, 1943c) from shell middens along this old shore-line, but it is intended to undertake a detailed study of the deposits at a later date because they may reveal important data about the prehistory of the north coast. These analyses of implements from the later workshops are submitted as a preliminary approach to the general problem of the advent of man and the implements used in this area. Thorpe (1933, pp. 344-45 and map) drew attention to a similar problem in the Hunter River basin when he stated that "implement found above the thirty-foot contour might be ascribed to comparative antiquity", but here again detailed investigation is necessary.

Classification.—As new evidence is brought forward it is possible to gain a clearer understanding of typological problems. From data now available it is clear that the worimi is, technically, a slice of the cleaver type, although I have previously classified it as a block. The karta, as I have used the term on the coast of New South Wales, includes both slices and blocks, although they have previously been regarded as coroids.

**Point Plomer.**

Point Plomer is a prominent headland situated at the northern end of a beach eight or nine miles long which extends southward to Port Macquarie. The Point consists of several high, rounded, grassy headlands, the rocky faces of which are now torn into rugged blocks and clefts by the sea and winds. The workshop is on the dunes right at the end of the beach and adjoins the southern headland of the Point. At the present time the site is limited to a trough, about one furlong long and fifty yards wide, in the dunes furthest from the beach. Previously, however, according to the late Mr. T. Dick's photographs, it covered a much larger area and extended to the back of the beach, but wind-blow and sand has built up recent dunes over this eastern portion. Although no shell-midden deposit is now apparent as a layer in the dunes, there are patches of dark ashly soil to be seen. One of Dick's photographs shows a small mound of potters (PetiteDonatz detoideus Lamarck), but elsewhere these shells are rather thinly scattered at the present time. Pippies are obtainable in quantity on the beach between high and low water. Here and there on the workshop are to be seen fireplaces marked by assemblies of burnt stones, some of which are suitable for grinding into red pigment. Another portion of the workshop at the base of the headland is now overgrown with grass.

The manufacturing techniques and uses of the implements at Point Plomer are discussed at the end of this paper.

**Materials.**—Dr. Voisey (1934, p. 340) stated that Racecourse, Delicate, Nobby's and the Big Hill headlands are composed of Permian (?) rocks of the Kempey series, in which occur bands of sandstone, tuffs, mudstones, claystones, and inclusions of grey shale. The sandstones and tuffs vary greatly in colour, texture and composition, and may be termed tuffaceous sandstones. These remarks also apply to Point Plomer, where pieces broken off the two headlands by wave action are washed onto a small beach between them as smoothed pebbles and boulders. The aborigines took the latter to the send dunes to make their implements. I might mention that the nature, occurrence, and use of the materials are the same at Crescent Head, about 10 miles to the north (McCarthy, 1941c, p. 22).

Occasional implements of a brown chert, brought from elsewhere, also occur. Merewether chert is not represented and was apparently not traded so far northwards.
Knapped Implements.

Blocks (fig. 6).—A series of thick and irregularly shaped pieces heavily worked on the edges of their steep-faced margins. One is tongue-shaped and trimmed along both lateral margins and distal end. They are from 6 x 6 x 3 cm. to 12 x 8 x 4-5 cm. in size, and from 4 oz. to 1 lb. in weight.

Slices.

(a) Split Pebbles (fig. 5).—The two examples are both about 14 x 9 x 3 cm. in size. One has the point of percussion on a striking platform at one end, and it is on a lateral margin on the other specimen. One is trimmed along both lateral margins and end, the other along one margin, both on the inner face, which is flatter.

(b) Worimi Cleavers.—In 1941 I described (1941c, p. 24, PI. vi, fig. 11) a single worimi found on a pippy midden on Crescent Head Beach. One surface of this specimen is a fracture or inner face, the other is of cortex. I considered this cleaver-like construction of the implement to be unusual, but at Point Plomer and the other sites dealt with in the present study it is the predominant type, there being forty-nine specimens from Point Plomer alone. The angle of the two surfaces ranges from 60° to 70°. They are all large slices struck from pebbles and boulders.

Twenty-nine have the point of percussion at one end (PI. xxxviii, fig. 3) and sixteen of them possess a striking platform. The point of percussion is not always in the middle of the platform, but is frequently towards one side or the other, and is on the corner of the butt and lateral margin of some specimens; on the other twenty specimens it is on the lateral margin of seventeen and is indiscernible on three. The inner angle ranges from 10° to 70°, and the angle of the two surfaces ranges from 41° to 140°. The cortex surface is either flat, rounded or slightly concave. The cortex surface is either flat, rounded or slightly concave. The cortex surface is either flat, rounded or slightly concave.

These asymmetrical worimi were struck from the nucleus in such a way that the desired form, a thick-backed segment to roughly semicircular and trapezoid specimens. The ideal form is thus a thick-backed pebble axe ground at one end on both faceted and end margins.

Edge-Ground Axes.—Two are pebbles 10-15 cm. long, with a sinuous edge formed with the inner face, is more frequently trimmed (figs. 15, 17, 19-22) along one margin, both on the inner face, which is flattened. The cortex surface is either flat, rounded or slightly concave. The cortex surface is either flat, rounded or slightly concave. The cortex surface is either flat, rounded or slightly concave.

The seventy-eight specimens are from small and scattered patches of shell midden in the dunes fringing a very long beach which extends from Tacking Point, five miles the cortex surface. One specimen in this group is of dark green chert from Racecourse Head, a few miles to the north of Point Plomer.

There are twenty specimens of the worimi both surfaces are fracture faces. On three the thin margin is used, and on three it is use-polished. On four it is trimmed, one having a semidiscoidal edge, and they bear concaves from 1.5 to 2.5 cm. wide and 1 cm. deep, and range from 2 oz. to 1-5 lb. wide; three of them are brown sandstone.

Ten additional worimi both surfaces are fracture faces. On three the thin margin is used, and on three it is use-polished. On four it is trimmed, one having a semi-discoidal edge, and they bear concaves from 1.5 to 2.5 cm. wide and 1 cm. deep, and range from 2 oz. to 1-5 lb. wide; three of them are brown sandstone.

The worimi range from 9 x 6 x 4 to 20 x 12 x 7 cm. in size; eight are 3-5-4 cm. and the balance 5-8 cm. in thickness. They range from ½ lb. in weight, the majority being 1-3 lb. All but three mentioned above are made of dark grey tuffaceous sandstone.

(c) Korta.—The twenty specimens are all slips and blocks, with a cortex outer surface. Various parts of the margins are trimmed from the inner face with the flake-scars on the cortex surface. There is a striking platform on the end of three, and on the balance the point of percussion is irregularly placed on either a lateral or end margin. The working edges are notched and irregular, and concaves of various widths appear on some of them. On several specimens the working edge is semi-discoidal, and one is a discoid (fig. 13). In shape the korta are mainly oval. One is an old knapped blade weathered on the inner face but re-edged at a later date. They range from 6 x 5 x 3 to 14 x 10 x 4 cm. in size, with one 16 cm. long, and from ½ to 1 lb. in weight.

Sundry Slices and Normal Flakes and Blades.—There is no normal flake and blade industry on the site. Although there are large numbers of flakes knapped during the shaping of the large implements, an extraordinarily low percentage bear any signs of trimming on their edges. Only fourteen specimens were found in several days' collecting. They comprise eight large and thick pieces, 5-11 cm. long, which are actually small slices, and five flakes 6-7 cm. long, of which 7 of the series are trimmed on the adjoining lateral and end margins, and several bear small concaves. Many possess notched edges. The point of percussion is at the end on a striking platform on the majority of the flakes on the site. Among them are numerous flakes of a poor quality light-grey chert or shale which are weathered and also blunted on the edges. The normal flake and blade implements knapped from the smaller nuclei on this workshop must have been taken away to other camp sites in the district, but the latter have not been located.

Fabricators.—No pebble hammerstones were found. Five trimmed fabricators were collected, but they are uncomon on the site. One is a tanged slice, 16 x 6 x 5 cm. in size, two are blocks, and two are coroids. Their edges are battered from percussive use. They are from 6 x 5 x 4 to 10 x 9 x 6 cm. in size and from ½ to 1 lb. in weight.

Edge-Ground Axes.—Two of the four specimens collected are so weathered that they were left on the site, and both consist of a large elongate blade with a ground edge. The other two were retained. One is a trimmed coroid, 18 x 9 x 3 cm. in size and 1 lb. in weight. The other is a windung uniface pebble axe ground at one end on both facets and appears to have come from Crescent Head, to judge by the material. All are made of tuffaceous sandstone.

Fish-Hook Files.—The only specimen found is of coarse sandstone. It is slightly convex on both surfaces and conical in shape. It is 5 x 2.75 x 1 cm. in size. This is the furthest north at which sandstone fish-hook files have been recorded, Port Stephens having previously marked this point (Thorpe, 1932, pp. 307-9, 311, PI. xxxix).

TACKING POINT BEACH.

The seventy-eight specimens are from small and scattered patches of shell midden in the dunes fringing a very long beach which extends from Tacking Point, five miles north of Racecourse Head, few miles to the north of Point Plomer.

On ten additional worimi both surfaces are fracture faces. On three the thin margin is used, and on three it is use-polished. On four it is trimmed, one having a semi-discoidal edge, and they bear concaves from 1.5 to 2.5 cm. wide and 1 cm. deep, and range from 2 oz. to 1-5 lb. wide; three of them are brown sandstone.

The worimi range from 9 x 6 x 4 to 20 x 12 x 7 cm. in size; eight are 3-5-4 cm. and the balance 5-8 cm. in thickness. They range from ½ lb. in weight, the majority being 1-3 lb. All but three mentioned above are made of dark grey tuffaceous sandstone.
south of Port Macquarie, to Camden Haven. The principal site is at the northern end of the beach, about half-a-mile south of the Point. The implements were collected by Mr. H. J. Wright, the late Mr. E. O. Milne, and the author over a period of about two years.

The materials vary from fine to coarse grained cherts, tuffaceous sandstone, and others. Merewether chert is not represented.

Artefacts.

Coroid Implements.

Nuclei.—There are fourteen specimens, with one, two or three simple platforms, on three of which there are two platforms at right angles to one another. Two slender pebbles have a platform at one end. One is a thin prismatic remnant 4 x 1-5 cm., with a platform at each end, and three other remnants have a used concave 1 cm. wide on the outer edge of the platform. They are 4-9 cm. long, 1-5-7 cm. wide, and 1-5-4·5 cm. thick.

One nucleus of white quartz is biconical, with alternate knapping right round its circular margin. It is 6 cm. long and 3 cm. thick.

Unifacete Pebble Implements.

(a) Lateral Edge.—This is the predominant type of large implement on the sites. The series of 26 specimens consists of well-worked and used elongate oval pebbles on which the working edge is convex on ten and straight on twelve; it is a long shallow concave on two, and there are alternate concaves and noses 1-2 cm. wide on two. The trimmed face of the working edge is steep-angled on most of them, and it is flaked back almost to the opposite margin on two. The end has been struck off one to form a striking platform from which flakes have been detached. Two are made of white quartz. They range from 9 x 6 x 2 cm. to 17 x 11 x 7·5 cm. in size and from 6 oz. to 41 lb. in weight.

Two additional specimens are trimmed on both lateral margins. One, 14 x 9 x 6 cm. in size and 2 lb. in weight, is keeled, pointed at one end and rounded at the other end. The other one, 10 x 7 x 4 cm. in size and 12 oz. in weight, has steep working faces with nearly trimmed edges on both lateral margins, while at one end an unused concave is bounded by two ridged spurs.

(b) End Edge.—A series of thirteen specimens somewhat smaller in size than the lateral-edged type.

The working edge is convex on five, on one of which it is like a huge nose, and is straight on three. One of the latter bears a concave 2 x 1 cm. with a rectangular nose 1 x 1 cm. The trimmed face is steep-angled on the majority. They range from 8 to 10 cm. long, 8 to 9 cm. wide, and 2 to 3·5 cm. thick, and from ½ to 1 lb. in weight.

Four specimens are more carefully trimmed than the above nine specimens. The flakes are long and narrow and at a very low angle, while the natural contour of the surface has been preserved. This distinction occurs generally among the unifacete pebble implements (McCarthy, 1942a, pp. 131, 136). They range from 8 x 6 x 2 to 15 x 7 x 2·5 cm. in size, and from 8 oz. to 1 lb. in weight.

Knapped Implements.

Blocks.—One has a striking platform with an inner angle of 146°. There is a concave 2 x 1 cm. on its trimmed semicircular margin. The upper surface is pyramidal with a short central transverse ridge. It is 10 x 10 x 6 cm. in size and 12 oz. in weight. One has a concave 2 x 0·5 cm. on its trimmed lateral margin, and one of white quartz has notched edges. These two are 4 and 6 cm. long.

Normal Flakes and Blades.

Scraper-Knives: Pointed.—Five are trimmed on one edge only of the thick margin or back. One is a type i with the trimming on the back and plain end; three are of type ii with the trimming extending round the distal end; two are of type iii with the trimming extending round both ends. One of the latter the thin margin is rounded and use-polished, on three others it is scraper-trimmed, and on two it is plain and unused. They range from 3·5 x 1·5-1·25 cm. to 6 x 5·5 x 2·5 cm. in size.

Scraper-Knives: Flat.—Eight irregular blades are trimmed on one straight lateral margin and two are trimmed on both convex margins. One of the latter has a heavily faceted striking platform. They are 6 to 7·5 cm. long. On a small flake 3 cm. long is a concave 1 x 0·5 cm. There are, in addition, two segments 3 cm. long, trimmed along the thick margin, but they are not geometrical microliths.

Knives.—Two of these three narrow blades have slightly scaled convex edges and one of them has a straight use-polished edge in addition. They are from 4 to 6 cm. long.

Bondi points. Six specimens from 2 to 4·5 cm. long.

Small Flakes: One of the punch type used at both ends, and one used on one lateral margin of 4-5 cm. long.

Fabricators.—One white quartz coroid fabricator, oval in shape, 4·5 cm. long, on which the prominent edges of the flake-scars are battered.

Edge-Ground Axe.—The only specimen is a splendid example of the Windang uniface pebble axe. The blade has a broad ground facet on the trimmed surface, the other facet being cortex. A few flakes have been detached along the margins of the cortex surface by percussion use along the edges. It is 19 x 12 x 5 cm. in size, 5·1 lb. in weight, and made of tuffaceous sandstone.

DARK POINT.

This headland of reddish-grey porphyry is situated a few miles north of Port Stephens and about eighty miles south of Port Macquarie. The workshop extends across the dunes behind the headland, and it is not as extensive as the one at Point Plomer. The site is very inaccessible and although a larger series of specimens is desirable, the 114 dealt with in this analysis are of particular interest because of the wide range of materials and types represented. Merewether chert was freely used on the workshop. In each group of implements the materials are widely varied.

Artefacts.

Coroid Implements.

Nuclei.—There are twenty specimens with simple platforms, on five of which there is one platform, on two a platform at each end, and on three two platforms at right
Kna.pped Implements.

Blocks.—All but two of the eleven specimens are elongate and fiat-crowned with edges trimmed from the inner face along one or both lateral margins and sometimes also on the distal end. One, with a narrow butt and a broad trimmed distal end, is a type figured by Thorpe (1928, Pl. xix, fig. 1, and Pl. xxiii, fig. 1), from Lake Macquarie and Anna Bay. The working edges on the majority are convex, but one has a long shallow concave, and another one a series of concaves 1 em. wide separated by pointed noses round its distal end.

One of the three keeled specimens is trimmed on both lateral margins and end. Another one, of arapia-type, is trimmed all round its oval margin with step-trimming on one side and a long shallow concave working edge on the other side. It is 10 x 7.5 x 5 em. in size and 2 lb. in weight.

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One made of Merewether chert, 8 x 5 x 5 cm. in size, has a poorly formed compound platform.

Uniface Pebble Implements.

(a) Lateral Edge.—Three specimens with convex edges. On one a trimmed corner forms a large nose 4.5 cm. wide and 2 cm. deep. Two are of coarse porphyry. They are from 13 x 7 x 5 to 15 x 7 x 6 cm. in size, with one 9 cm. wide, and from 11 to 2 lb. in weight.

(b) Lateral and End Edge.—A splendid example made of a fine-grained tuffaceous shale (?). The margin is trimmed on one side and both ends to form a semicircular working edge with a steep-angled face. It is 13 x 11.5 x 5 em. in size and 2 lb. in weight.

(c) Sumatra-Type.—The three specimens are made of porphyry and tuffaceous sandstone. One is an almost ideal example of the complete uniface type and is the largest of the series. They range from 13 x 8 x 4 to 17 x 11.5 x 8 em. in size and from 1 to 2 lb. in weight.

Knapped Implements.

Blocks.—All but two of the eleven specimens are elongate and flat-crowned with edges trimmed from the inner face along one or both lateral margins and sometimes also on the distal end. One, with a narrow butt and a broad trimmed distal end, is a type figured by Thorpe (1928, Pl. xix, fig. 1, and Pl. xxiii, fig. 1), from Lake Macquarie and Anna Bay. The working edges on the majority are convex, but one has a long shallow concave, and another one a series of concaves 1 cm. wide separated by pointed noses round its distal end.

One of the three keeled specimens is trimmed on both lateral margins and end. Another one, of arapia-type, is trimmed all round its oval margin with step-trimming on one side and a long shallow concave working edge on the other side. It is 10 x 7.5 x 5 cm. in size and 1 1/2 lb. in weight.

Figs. 1-14.—Uniface pebble implements with lateral and end-working edges, and a sumatra-type. 5. Split-pebble slice trimmed on inner face. 6. Block of crown type trimmed on end and lateral margins. 8. Cored with alternate platforms. 9. Cored with use-polished edge. 9. Worimi with cortex back and use-polished chord. 10. Worimi with both lateral margins trimmed. 11. A small worimi with use-polished chord and trimmed end. 12. Conical nucus with simple platform. 13. Discoid karta. 14. Nucleus with a striking platform at each end. Nos. 2-7, 13-14 are from Point Pioneer, and Nos. 8-12 from Dark Point.
The point of percussion is at the end on three and on the lateral margin on two, the others being indeterminate. The only inner angles measurable are 130°, although one has a right-angled cortex striking platform. They range in size from a small pyramidal block 5·5 x 5·5 x 3 to a thick elongate specimen 16 x 9 x 6 cm., with one 10·6 cm. wide, and from 4 oz. to 2 lb. in weight.

Slices.

(a) There is one oval slice of fine-grained brown chert, with a trimmed convex edge, 13 x 9 x 8 cm. in size.

(b) Split-Pebbles.—The working edges of the six specimens are trimmed from the cortex surface on one or both margins. They range from 8 x 7 x 5 to 16 x 9 x 6 cm. in size and from 2 oz. to 2 lb. in weight.

(c) Worimi Cleavers.—An excellent series of thirty-eight specimens is represented. In shape they vary from thin blade-like examples to thick segments, a number being irregular and poorly fashioned. Fourteen are formed by a cortex surface opposed to a fracture surface or inner face, the thick back being shaped by knapping. Twenty-four possess two fracture surfaces, and on three of them the outer face consists of several large flake-scars. Four have a rounded back with cortex surface (fig. 9) and the balance are knapped to shape. On a minority the back is crescentic and carefully trimmed, but on the majority it is roughly knapped. On sixteen the inner edge of the back is trimmed and bears signs of use; on twelve this trimming extends round one end and on four round both ends. Two are trimmed on both edges of the back; one (fig. 10) of them, of Merewether chert, has step-trimmed edges, and one of fine-grained porphry has battered edges due to percussion use, probably as a fabricator. Both are trimmed on the thin margin in addition.

The thin margin is smoothed and rounded by use-polish on ten, one of which was figured by Thorpe (1922, p. 302, Pl. xxviii, fig. 2, E32372); on three of them the use-polish has smoothed a previously trimmed edge, but as a rule there is no trimming on a use-polished edge. On one (fig. 9) half of this margin is use-polished and the other half is trimmed, and on another one (fig. 11) both edges of the thick end are neatly trimmed to form a semicircular end joining a use-polished thin margin. On seventeen this margin is trimmed from the inner face and one from both surfaces. Nine are unused on the thin margin. One outstanding specimen was figured by Thorpe (1922, pp. 302, 310, Pl. xxviii, fig. 1, E32371). It is made of fine-grained grey quartz-porphry and has a cortex surface opposed to a fracture or inner face. It is well trimmed along its steep-faced thin margin and butt end, and the striking platform has been eliminated. Its working edges bear a number of small concaves and notches. It is 16 x 15 x 5·5 cm. in size and 4 oz. in weight. Another fine specimen (fig. 13), made of a fine-grained brown quartzite, is a perfect segment, with two fracture faces, and is trimmed on all three edges; it is 15 x 8 x 6·5 cm. in size and 1·3 lb. in weight. It is as well to mention that the use-polished thin margin is often combined with one or two trimmed edges on the back of worimi.

On thirteen the point of percussion is on a striking platform at one end, being of cortex on several specimens. The inner angle ranges from 123° to 149°. The point of percussion is on the lateral margin of four and is indeterminate on twenty-one, most of which are of coarse porphry.

They are from 7 x 6·5 x 5·5 to 18 x 15 x 6·5 cm. in size and from 3 oz. to 4½ lb. in weight.

Three coroid worimi will be described in this section. They are elongate, thick lumps of porphry and tuffaceous sandstone, with flat cortex upper and lower surfaces. One has almost vertical and roughly knapped sides. The second one has one edge of one side trimmed, and above it a cortex face sloping sharply to the upper surface.

The third one (fig. 8) has one crescentic side, roughly flaked on an almost vertical face, while the lower edge of the other steep side has the most pronounced use-polished edge that I have seen on any implement; the polishing extends 1·5 cm. up the side and 9·5 cm. back from the rounded edge on the lower surface. Although trimmed coroids, these implements possess all the other characters of the worimi cleavers. They range from 10 x 6 x 5 to 13 x 8 x 4·5 cm. in size and from 1 to 2 lb. in weight.

Karta.—The eight specimens are oval slices 8–10 cm. long. One is trimmed from the inner face all round, and two on both lateral margins. They range from 8 to 10 cm. long and from ½ to 1½ lb. in weight.

Normal Flakes and Blades.—A small series of six knives, six side-scrapers, one with a semicircular working edge, and one elocera of type II. They range from 4 to 9 cm. long.

Percussion Stones.—No pebble hammerstones are represented, but there are nine trimmed coroid fabricators, most of which are discarded nuclei with battered edges and projections. Four are elongate and keeled, and three of them of grey chert have a poorly formed compound striking platform. Two are spheroidal and two are irregular. One trimming stone is a rectangular piece of grey chert, flat on both surfaces, with vertical sides which appear to have been rubbed on a number of facets; both edges at one end and one edge of one margin are battered. They range from 6 to 10 cm. long. Edges of two others have been roughly ground with a stone flake and one of them has a cortex face sloping sharply to the upper surface. The other has one end and one edge of one margin. They range from 6 to 10 cm. long. Edges of two others have been roughly ground with a stone flake and one of them has a cortex face sloping sharply to the upper surface.
Only four (fig. 16) consist of a cortex surface opposed to a fracture face on the sides. One of the chert specimens of this kind is half of a thick pebble split diagonally and laterally. The balance possess an inner face, and an outer face bearing flake-scars made prior to the detachment of the piece from the nucleus. The thick crescentic back is roughly flaked to a steep face. Some are irregular in shape, but all conform to the general orange-segment formation characteristic of the worimi. On a few examples the upper edge of the thick back is close to or in the middle of the outer surface on which it forms a median keel. One Merewether chert specimen is semicircular in shape. Edge trimming on the thick back is present on very few of the porphryy worimi, probably because of its coarse and unsuitable trimming qualities, but it is well shown on three of the Merewether chert specimens, one of which has a trimmed semicircular thick margin.

The point of percussion is variously situated. It is on the end of nineteen, a minority of which possess a striking platform, on the lower edge of the thick back of two, and is indiscernible on three. The inner angle ranges from 120° to 135°, with one at 110°.

The thin margin is use-polished on five, including one of chert figured by Thorpe (1928, Pl. xx, fig. 3), but he did not refer to this working edge. It is trimmed from the outer or cortex surface on fifteen, five of which are convex, five straight, four slightly concave, and one has a concave 4-5 cm. long and 1 cm. deep; four of this group are of Merewether chert; the remaining four are unused on this margin. Miss Hall has described and figured a number of these specimens (1928, pp. 277-78, Pl. xxxvii, figs. W1, W2, W3, Pl. xxxviii, XI-2) and McCarthy one (1941a, p. 257, fig. 6). They range from 9 x 7 x 4 cm. to 10 x 10 x 7 cm. in size, and from $\frac{1}{2}$ to 1 lb. in weight. There is no line of demarcation between the small light and the large heavy specimens.

ANNA BAY.

There are forty worimi slices from this site. All but one of andesite are of red or grey porphryy, frequently coarse in texture.

Three consist of two cortex sides, nine of a cortex opposed to a fracture or inner face, and twenty-eight of a knapped outer face and an inner cleavage face. The thick back is formed in the same manner as on those from Morna Point. The distal end of one is trimmed into a semicircular edge like a large nose. One resembles very closely a lateral-edged uniface pebble implement.

The point of percussion is on a striking platform at the end of twenty specimens, on a lateral margin of five, and is indiscernible on fifteen. The inner angle ranges from 133° to 135°, with one at 140°. The thin margin is use-polished on five. It is trimmed on thirty-three specimens, twelve of which are convex, twelve straight and nine concave; six of them have one concave 7-10 cm. wide, and three have one or two concaves 1-3 cm. wide. This margin is unused on two specimens. They range from 8.5 x 5.5 x 4.5 to 16 x 12.5 x 5 cm. in size, but up to 9 cm. in thickness, and from $\frac{1}{2}$ to 4 lb. in weight. Several of these worimi were figured by Thorpe (1928, p. 245, Pl. xxi, figs. 1-2, Pl. xxii, figs. 1-2) and McCarthy, 1941a, p. 257, fig. 7).

The data given above regarding the worimi may be tabulated as follows:

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<th>Anna Bay</th>
<th>Morna Point</th>
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</table>

* There are three coroid examples.
The dimensions of the 124 worimi cleavers from Point Plomer, Anna Bay and Morna Point are as follows:

<table>
<thead>
<tr>
<th>Length (mm.)</th>
<th>Width (mm.)</th>
<th>Thickness (mm.)</th>
<th>Weight (oz.)</th>
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</table>

This table reveals a wider dispersion in length and width than in thickness and weight, and particularly a narrow range in the two latter characters. Exceptionally large specimens are uncommon.

**Table of Artifacts**

<table>
<thead>
<tr>
<th></th>
<th>Point Plomer</th>
<th>Tacking Point</th>
<th>Dark Point</th>
<th>Sub-totals</th>
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<td>Alternate platform</td>
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<td>Sub-totals</td>
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<td>Normal Flakes and Blades</td>
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<td>Abode implements</td>
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<td>Fish-hook blades</td>
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</table>

In addition there are 64 worimi from Morna Point and Anna Bay.

**Technique**

It will be noted in the table that the nuclei with simple platforms form a distinct majority, while those with alternate and compound platforms are comparatively scarce. The knapped implements do not always possess a striking platform; in fact, it is present on a small proportion only. On the worimi the inner angle, where measurable,
One other point of importance is that most of the axes found on the workshops at Crescent Head, Point Plomer, Tackling Point beach and Dark Point are of the Windang uniface pebble type (McCarty, 1941), an occurrence which supports the conclusion that this axe is a transition type from the trimmed to the ground edge. Curiously enough, pecked and unpecked and biface coroid edge-ground axes are ploughed up on farms along the alluvial banks of North Coast rivers. Two pecked axes from the Port Macquarie district were presented to the Museum by Mr. Pountney in 1945. The unpecked edge, to judge by its common occurrence on the worimi cleaver, is the result of a special use of these implements. The first explanation of the manner in which this edge is produced is the cleaning and scraping of skins for cloaks, and another one is the scraping of the rough outer shreds from the sheets of bark used for making canoes, shields, and containers. The scraping of wooden weapons and implements could also produce such an edge. Only experiment will demonstrate which of these suggestions is correct. It must not be forgotten that the use-pecked edge occurs not only on large implements like the worimi, but also on normal flakes and blades such as cleavers and unspecialized kinds.

**Point Plomer Implements.**

The Australian Museum possesses a collection of photographs of the Port Macquarie natives, made by the late T. Dick, whose observations extended from 1859 to 1877 in his daily occupation as an oyster-farmer and fisherman on this estuary. He took a kindly interest in the local aborigines, especially in their problems arising from contact with the whites, but he also made a deep study of their customs. So sincerely did they respect him that he was able to get them to make replicas of their weapons, domestic articles like bags, baskets and bark containers, and canoes, ornaments and skin cloaks, public amulets and ritual objects, and with these and the old specimens that he had collected they re-enacted various aspects of their daily and ceremonial life. In addition, he wrote a manuscript embodying the information he collected, but unfortunately this work and his collection of specimens, including those shown in the photographs, cannot now be traced by the surviving members of his family.

Among the photographs are about fifty in which stone implements are shown. The majority of these, at Point Plomer, others in the mangrove swamps along the western and southern shores of Port Macquarie, and few elsewhere in the district. In assessing the value of these photographs insofar as their accuracy is concerned it must be remembered that they are not of natives living in their original primitive state, but of more or less civilized individuals re-enacting the past. T. Dick had the benefit of information from his father, J. S. Dick, who had lived in the district for sixty years and had seen the natives using stone tools. Settlement was established at Port Macquarie in 1831, and it can be accepted without doubt that from this date onwards metal axes and other tools, and bottle-glass, were given by the settlers to the natives with goodwill and to pay them for services rendered. Their names and ages, so far as they are known by his son, Raymond Dick, who knew them personally, are as follows: Charlie Murray, between 65 and 70 years of age; Peter Budge, between 70 and 75; Neil Morem, 40; and Ted Dungay, 40; Mrs. Murray, Mrs. Dungay.

Raymond Dick told me that Murray and Budge knew a great deal about the traditional life of their people, and probably about stone implement manufacture, but both were born after 1850. Mr. T. Dick is to be commended very highly for his admirable effort to preserve a knowledge of the past with these photographs, but for the sake of accuracy it is necessary to evaluate them in the light of present-day knowledge, because they illustrate both doubtful and authentic methods of manufacture and uses of stone implements in this area. The following remarks are not, therefore, a criticism, but merely an impartial review of the evidence presented by Mr. Dick.

No less than five photographs show the placing of pebbles on the fire for fracturing purposes (Pl. xxxvi, fig. 2), but none of the implements collected show any signs of having been in the fire, moreover, the presence of a striking platform, point and bulb of percussion on the majority of specimens, each struck by one blow, appears to rule out the employment of the heat-fracturing method in the old days. Thorpe (1932, p. 302) conjectured the use of this method in the Newcastle district. Actually, the effect of fire on tuffaceous sandstone and chert is to soften the stone.

Two methods of knapping are shown and these are probably correct. They are both variants of direct rest percussion (Holmes, p. 300, fig. 163). Pl. xxxvi, fig. 1, demonstrates the removal of large flakes from a massive nucleus set upright on the ground; this is a large two-handed knapping with a widespread method of knapping, that in which the nucleus is placed and held firmly in one hand on an anvil stone, while the hammerstone is held in the other hand. Pl. xxxvi, fig. 4, illustrates the latter technique applied to a working edge, but the implement should be lying flat on the anvil stone to make it possible to trim the edge. These are obviously implements picked up on the workshop and not made by the natives shown in the photographs.

None of the photographs shows direct hand-fracture (Holmes, 1919, p. 234, fig. 144) recorded by Roth in Western Queensland (1904, p. 16, fig. 23) but it was probably employed in trimming and shaping implements.

The only other technique illustrated is that of grinding the blades of axes, which implements appear to be more common than pebble types picked up on the workshops. Pl. xxxvii, fig. 3, shows the grinding being done on an outcrop of sandstone (? at Green Hills, twelve miles south of Port Macquarie. Raymond Dick has informed me that there are no axe-grooves at this site. Another photograph shows the use of the sand-covered surface of a pebble for the purpose; I did not collect any pebbles bearing axe-grinding grooves, but Raymond Dick has informed me that his father collected several examples. It might be mentioned that in other parts of New South Wales this process produces definite grooves up to 30 cm. long, 5-6 cm. wide, and 1 cm. deep. Polished whetstones from 7 cm. to 30 cm. long, bearing a groove, are widely distributed in Australia.

In regard to the uses of the implements the same feeling of uncertainty exists as to whether or not these natives really knew the exact or correct type of stone implement to use for the various operations illustrated. The photographs are, however, valuable in demonstrating a wide range of the known uses of stone implements, and furthermore, they are, so far as I know, the only series in existence dealing with the coastal natives of New South Wales. Both Kerr’s and Lindt’s photographs are of physical types and ceremonies, and they do not illustrate stone implement techniques and uses. Pl. xxxvii, fig. 2, shows the use of a hand-scraper or graver on a boomerang, and in several other photographs a carved stick is substituted.
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taken from the original stones that the reused part now only weighs a few pounds.

. The late John Stuart Dick of Port Macquarie had often seen the natives removing the stones

in the early days of the settlement by stone tools only... and by steel tools as well. It was
the information given by this Mr. Dick that led to the search amongst the trees, as he often
drew my attention to those which were marked ...

Mr. E. H. Dick saw a native using a stone shaped similarly to the gods used for hacking stone, only the point was not made

fire, but on the contrary, it was blunt and would not enter timber. The rabbet was cut to

take the wedge to fit, and to allow this wedge to be driven in. The two or three great lifting power...

nine or eight wedges were driven into the rabbet and when the tree was hard, there would be a number of wedges destroyed and dropped, and these can be found

at the present time by digging round old trees. To get the lifting power the wedges were made

practically double the width of the rabbet into which the wedge were driven. To be driven.

the

having been removed, would be carried to the camp, where with smaller wedges and cutting

costs its manufacture would soon be finished ...

in cutting the rabbet, the two kinds of stones were evidently used, one of them was a shaped and ground axe made from stone and another

formed to fit the hand, and was ground, the edge being kept keen by chipping the blade.

In several instances when axes from which part of the wood where had jumped out were found

as much a foot of the tree ...

Two nfolk (ppl. xxm) are shown engaged driving the peculiar bluff wedges into the special rabbet, the man on the left is holding up the wedge to

the native on the right, who is driving them in with a stone hammer. (Fig. 10.)

Bradley, L. W.—Journal, 1788-1792, including a Voyage to New South Wales. (Manuscript

Bradley, L. W.—Journal, 1788-1792, including a Voyage to New South Wales. (Manuscript

Bradley, L. W.—Journal, 1788-1792, including a Voyage to New South Wales. (Manuscript


Roth, W. E., 1904.—Domestic Implements, Arts, and Manufactures. *North Queensland Ethnography, Bull. 7.*


**EXPLANATIONS OF PLATES.**

Plate xxxvi (Point Plomer).

Fig. 1.—Knapping flakes from a large nucleus.

Fig. 2.—Placing a pebble on a fire to split it into pieces.

Fig. 3.—Natives on the workshop, knapping flakes and shaping weapons.

Fig. 4.—Trimming a lateral-edged uniface pebble implement.

Photographs by the late T. Dick.

Plate xxxvii.

Fig. 1.—Cutting a groove round the trunk with a hafted stone axe in the process of removing a sheet of bark for a canoe. Port Macquarie.

Fig. 2.—Shaping a boomerang with a knapped scraper. Point Plomer.

Fig. 3.—Grinding axe-blades at Green Hills.

Fig. 4.—Removing the stringy outer bark with a hafted stone axe on a sheet intended for a canoe. Port Macquarie.

Photographs by the late T. Dick.

Plate xxxviii.

Fig. 1.—Cutting out a shield with stone implements. This tree is still standing in the mangrove swamp on the south-western shore of Port Macquarie. (Photograph by the late T. Dick.)

Fig. 2.—Large conical implement, Point Plomer.

Fig. 3.—Inner face of a large *worimi* cleaver, Point Plomer.

Fig. 4.—Outer face, showing the trimmed lower edge of the thick back of a large *worimi* cleaver. Point Plomer.

Fig. 5.—The largest *worimi* cleaver from the Point Plomer workshop. It has a fracture face opposed to a trimmed face. (Photograph by G. C. Clutton.)

Plate xxxix (Port Macquarie).

Fig. 1.—Cutting a gnarl from a gum tree with a hafted stone axe.

Fig. 2.—Cutting a design on a tree with a stone axe-head.

Fig. 3.—Cutting up a dolphin with a stone knife.

Photographs by the late T. Dick.